

Research Note 82-8

①

PREDICTION OF INFANTRY SQUAD ERRORS DURING  
TRAINING: PILOT INVESTIGATION

Jean L. Dyer

ARI FIELD UNIT AT FORT BENNING, GEORGIA

DTIC  
ELECTE  
APR 15 1983  
S D  
A



U. S. Army

Research Institute for the Behavioral and Social Sciences

January 1982

Approved for public release; distribution unlimited.

83 04 15 077

ADA 126975

DTIC FILE COPY

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

## Block 20 (continued)

likely to be made by trainees in performing particular missions appears to be an approach worth further exploration. Documentation of these predictions could provide very useful training requirement information to incoming commanders and trainers. Such documentation would provide continuity and maintain quality in training despite the constant turnover in training personnel. Further modifications of the procedure used in the present study and investigation of additional issues such as identifying errors that are difficult to correct are needed, however, before such guidelines can be incorporated in training materials.



SEARCHED	INDEXED
SERIALIZED	FILED
APR 1968	
FBI - NEW YORK	
A	

**PREDICTION OF INFANTRY SQUAD ERRORS DURING  
TRAINING: PILOT INVESTIGATION**

**Jean L. Dyer**

**Submitted by:  
Seward Smith, Chief  
ARI FIELD UNIT AT FORT BENNING, GEORGIA**

**Approved by:  
Milton S. Katz, Acting Director  
TRAINING RESEARCH LABORATORY**

**U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES  
5001 Eisenhower Avenue, Alexandria, Virginia 22333**

**Office, Deputy Chief of Staff for Personnel  
Department of the Army**

**January 1982**

---

**Army Project Number  
2Q263743A794**

**Skill Training Strategies  
for Infantry Teams**

**Approved for public release; distribution unlimited.**

# PREDICTION OF INFANTRY SQUAD ERRORS DURING TRAINING: PILOT INVESTIGATION

## TABLE OF CONTENTS

	PAGE
INTRODUCTION . . . . .	1
METHOD . . . . .	2
MOUT Training . . . . .	2
Prediction of Squad Performance Errors. . . . .	2
RESULTS. . . . .	3
MOUT Training . . . . .	3
Prediction and Observation of MOUT Errors . . . . .	5
DISCUSSION . . . . .	13
REFERENCES . . . . .	14

## FIGURES

1. MOUT Setting Presented to Infantry Company Commanders . . . . .	4
2. Location of Rifle Squads during MOUT Exercise . . . . .	4

## TABLES

1. Summary of Error Predictions. . . . .	6
2. Errors Predicted to be Made by the Attacking Squad when Assaulting the Building . . . . .	7
3. Errors Actually Made by Squad in the Assault. . . . .	8
4. Errors Predicted to be Made by the Attacking Squad when Clearing the Building . . . . .	9
5. Errors Actually Made by Squad when Clearing Building. . . . .	10
6. Errors Predicted to be Made by the Squad Providing Supportive Fire. . . . .	11
7. Errors Actually Made by Squad Providing Supportive Fire . . . . .	12

## INTRODUCTION

Personnel turbulence and the lack of experienced personnel in military units have often been cited as factors that create training problems (Dyer, Tremble & Finley, 1980; Funk, Johnson, Batzer, Gambell, Vandecaveys, & Hiller, 1980). Turnover disrupts training efforts and provides little continuity in training personnel, so that new training personnel at the squad, platoon, or company level cannot profit from the experience of their predecessors. The use of inexperienced training personnel has a direct negative impact upon training quality. Most Army training documents (e.g., FM 21-6, TC 21-5-7, TRADOC Circular 351-8) fail to provide the type of detailed information needed in such training situations. Only general guidance is given regarding the management of personnel, resources and time during training periods, procedures for preparing, conducting and evaluating training, and forms of individual and collective training. Such documents do not address the more specific questions of what objectives should be trained and what methods are best for training those specific objectives.

Some specific guidance regarding how to train within Infantry units is provided, however, in ST 21-6-188-2. Training tips/aids and points to be checked during company, platoon, and squad level ARTEP (Army Training and Evaluation Program) training missions are cited. Examples of training tips at the squad level were "leader TEWT is useful to practice leader tasks," "vary combat power of the force opposing the squad from one man to one squad," and "use barrels, sandbags, old tires, and other rubble to simulate a bombed out city." Yet none of these documents indicates what specific training problems/needs are likely to occur, e.g., the mistakes that individuals are likely to make in particular missions. The present study examined one way of systematically identifying such training problems/needs by capitalizing upon the expertise of experienced training personnel.

An exploratory investigation was conducted to determine if individuals with Infantry company command experience could predict errors likely to be made by Infantry squads in training situations. The particular situation examined was an Infantry platoon in a MOUT (Military Operations in Urbanized Terrain) training exercise. Although the results are limited in generality, they do provide some indication of the extent to which both individual and team performance errors can be predicted, and of areas that could be emphasized during squad training.

Previous analytic efforts in this area are meager. Military documents on MOUT (FM 90-10, ARTEP 7-15) provide little information on how to train for MOUT exercises and what to stress during those exercises. In an effort to improve the training given by air crew commanders, Caviness and Titus (1977) recommended specific training procedures based on their experience as members of airocrews and as airocrew instructors. Mirabella (1978) had noncommissioned officers (NCOs) act as squad leaders and provide estimates regarding the specific behavior of Infantry squads in ARTEP missions (e.g., maximum and minimum distances between fire teams, whether or not the enemy's observation post would be detected prior to crossing a critical phase line, the likelihood of the squad taking the observation post, time estimates for various mission phases, casualty estimates). The NCOs also made these predictions for four hypothetical levels of squad training. Results indicated that the NCOs' estimates did distinguish among the training levels, but that the level of agreement among the NCOs within each training level was low. The present study did not require quantitative predictions like those obtained in the Mirabella study, but was similar in that the estimates/predictions were based upon military experience.

## METHOD

### MOUT Training

An Infantry platoon consisting of two rifle squads was observed during MOUT training. The mission was to assault and clear a two-story building. One squad assaulted the building, while the other squad provided supporting fire. During training the assault was rehearsed several times. A military expert, a retired Infantry Lieutenant Colonel with particular expertise in training, observed the assault and recorded errors made by the squad members. These observations served as the criterion measures in the study.

### Prediction of Squad Performance Errors

Five Infantrymen, two captains and three majors, each with previous Infantry company command experience, were asked to indicate the errors that the squad members were likely to make during MOUT training. These individuals were either in the Directorate of Combat Developments or the Directorate of Doctrine and Literature within the U.S. Army Infantry School at Fort Benning.

The description of the MOUT mission given to each respondent was as follows:

To assault and clear a two-story building where the enemy may be located. The attack is to be conducted during daylight. The attacking force consists of two rifle squads--one to provide supporting fires while the other assaults the building.

Additional information regarding the MOUT setting was as follows:

The northeast corner of the building to be assaulted is located approximately 100-200 meters from a woodline. The building is a wooden structure with windows and a high foundation. A door is located at each end of the building. The woodline gradually curves away from the building on its east side. About 20 meters to the west is another building which parallels the building to be assaulted. Other buildings are located approximately 300-500 meters southeast and southwest of the building. In reality there is no enemy in the building. (See Figure 1 for a diagram of the MOUT setting).

The attacking force has no grappling hooks or rope. The squads are relatively inexperienced with MOUT operations, obtaining most of their information via classroom lecture. They have had no previous field experience with MOUT operations.

The respondents were asked to address three questions: (1) What errors are likely to be made by the attacking squad when assaulting the building, (2) what errors are likely to be made by the attacking squad when clearing the building, and (3) what errors are likely to be made by the element providing supportive fire. The responses to these questions were then coded according to their agreement with the errors actually observed during training by the military expert. The codes were determined by the military expert and the author.

## RESULTS

### MOUT Training

One of the difficulties encountered by the squads was the absence of an opposing force. This made it difficult to evaluate the role of the supporting fire element, and for the assaulting squad to perform as it would if an enemy were actually present. To complicate this problem, little effort was made to present a hypothetical enemy situation to the squads. The squads were not equipped with appropriate MOUT equipment, and they also had limited numbers of simulators (smoke, grenades, etc.). Blank ammunition was provided to only the machine gunner, not the riflemen.

The squad attacked from the northeast, assaulted the northeast corner of the building, and entered the door on the north side (see Figure 2). This approach gave the squad the shortest route to the building, but it also meant that they faced the highest entry point into the building. The difficult entry slowed the entry process, and made the squad vulnerable to possible enemy fire. The fire support element was in the woods, at the location indicated on the map (see Figure 2). This element did have good cover, as the ground started to decline at the edge of the woodline. Only one machine gun was available for the exercise.



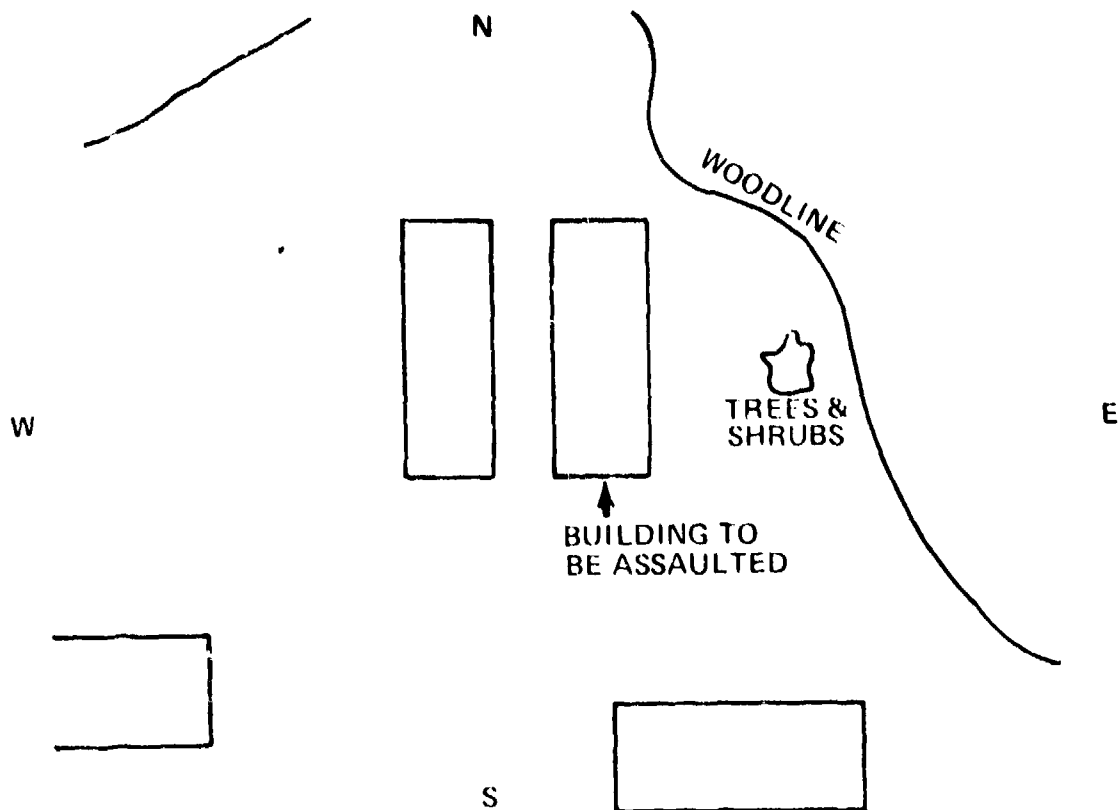


FIGURE 1. MOUT SETTING PRESENTED TO INFANTRY COMPANY COMMANDERS

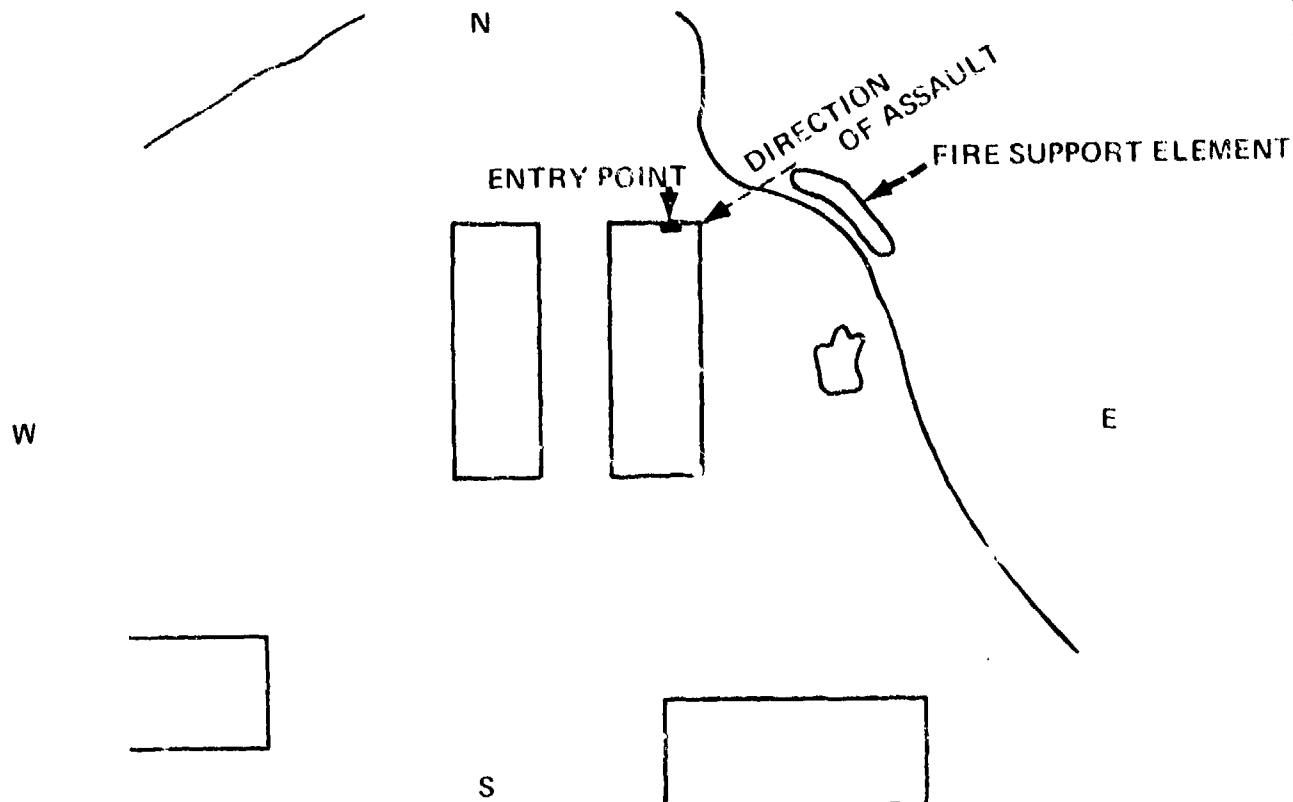


FIGURE 2. LOCATION OF RIFLE SQUADS DURING MOUT EXERCISE

## Prediction and Observation of MOUT Errors

A summary of the responses made to the three questions is presented in Table 1. Of the 21 errors explicitly cited by the military expert, six of them were not predicted by any of the respondents, and only one error was predicted by all five respondents (lack of coordination between the assault and support elements (Table 7)). Most of the other errors were predicted by only one or two of the respondents. Six other errors were predicted but were not committed by the squads. A total of ten other errors were correctly predicted, but were not explicitly cited by the subject matter expert. In general, most of the respondents' predictions were appropriate for the MOUT exercise, and most (71%) of the errors observed were predicted by at least one of the respondents. However, there was relatively little overlap among the respondents' predictions.

Predictions regarding the assault phase of the MOUT exercise appeared to be the most difficult to make. Responses to the assault question resulted in the lowest degree of overlap among the respondents' predictions, the highest number of errors that were incorrectly predicted, and the highest number of errors that were correctly predicted but were not explicitly cited by the military expert.

Tables 2, 4, and 6 present the predictions made by each of the respondents to each of the three questions. The errors observed by the military expert are presented in Tables 3, 5, and 7. The relationship between the expert's observations and the respondents' predictions is also shown in these tables.

The predictions made and the actual errors observed reflected both individual errors (no M16A1 rifle slings, exposure of body to open windows) and team errors. Team errors refer to squad behavior that lacked teamwork, that is, lack of coordination and planning among the individuals within the squads, as well as lack of coordination between the assault and support elements. Examples of such errors were no communication between downstairs and upstairs elements when clearing the building, lack of proper cover for individuals clearing rooms by the remainder of the squad, and slow squad movement from the woodline to the building.

Table 1

## SUMMARY OF ERROR PREDICTIONS

	Assault Building	Clear Building	Support Squad	Total
# errors cited by military expert	9	9	3	21
# errors not predicted by respondents	3	3	0	6
# errors predicted by only 1 respondent	5	3	1	9
# errors predicted by 2 respondents	1	1	1	3
# errors predicted by 3 respondents	0	1	0	1
# errors predicted by 4 respondents	0	1	0	1
# errors predicted by 5 respondents	0	0	1	1
# errors predicted, but were not made	5	0	1	6
# errors predicted and did occur, but were not explicitly cited by military expert	5	2	3	10
# other types of errors predicted, but coded as not applicable, cannot be evaluated, or observer disagreement regarding appropriateness of cited doctrine/tactics	3	3	4	10

Table 2

ERRORS PREDICTED TO BE MADE BY THE ATTACKING SQUAD WHEN ASSAULTING THE BUILDING

CODE Respondent #1

- E 1a. Will not plan for friendly casualties
- E 1b. Probably will try normal entry points into building first instead of breaching a wall
- NE 1c. Will probably move broadside to the building, increasing their exposure to wider range of enemy observer/fires
- DD 1d. Probably will move in short rushes until they receive fire; should begin by crawling

Respondent #2

- E 1a. Failure to conduct extensive recon!
- E 1b. Failure to use smoke properly (screening their movement). Should use explosives at base of building to enter. Doors and windows probably booby trapped
- E 1c. Use of supporting mortar fires are not planned on southern buildings after assault executed
- E 1d. (Failure to) cover the doors at each end of building with fire!
- NE 1e. Failure to attack from north where fewer windows

Respondent #3

- E 1a. Lack of good coordination between squad leader and team leaders
- E 1b. Lack of coordination with squad providing supporting fire
- E\* 1c. Improper movement through open area
- NA 1d. Improper equipment to break into building with
- NE 1e. Weapons jamming because of improper cleanliness

Respondent #4

- E 1a. Failure to use smoke to cover advance
- E 1b. Fail to secure the building to the west of objective building
- DD 1c. Failure to cover each other using fire and movement techniques
- NE 1d. Failure to make full use of woodline to minimize "distance in open" to be traversed.

Respondent #5

- E 1a. Too much exposure while entering the building
- NE 1b. Failure to use available cover

---

Code Definition

- E Error that was observed during exercise.
- E\* Error made - "improper" movement refers, however, to too slow movement.
- DD Observer disagreement regarding appropriateness of cited tactics/doctrine. Appropriate procedure depends upon the enemy situation, and no enemy was played.
- NE This error was not made.
- NA Not applicable. Scenario description stated squad did not have proper equipment. Squad should not be held responsible for this problem.

Table 3

## ERRORS ACTUALLY MADE BY SQUAD IN THE ASSAULT

Errors Observed by Military Expert	Respondents' Predictions that Agreed with Expert's Observation				
	1	2	3	4	5
a. No smoke was used or simulated		1b*		1a	2
b. Positive and back-up communication was not established with the support element.			1b		1
c. A good route from the woodline to the building was selected, however, the worst possible entry point was selected - a first floor that was too high to enter without assistance. Entry should have been (1) through the floor, (2) from the second story, or (3) with assistance, e.g., ladder into the first story.	1b				1
d. An M203 was selected for the assault force but was difficult to handle and would have been ineffective in the building.					0
e. Several M16s did not have slings, making it difficult to hold the rifle while climbing.					0
f. Initial entry was made by throwing the rifle into the room and climbing up after it.					0
g. Difficult entry into first floor, also resulting in a slow, exposed entry.				1a	1
h. No coordination between initial assault squad/team and the second assault squad/team.			1a		1
i. Despite the short distance from the woodline to the building, the squad movement across the area was slow.			1c		1
Other errors that occurred but were not explicitly commented on by the military expert	1a	1a, 1c, 1d		1b	5

\*See Table 2 for item identification

Table 4

ERRORS PREDICTED TO BE MADE BY THE ATTACKING SQUAD WHEN CLEARING THE BUILDING

CODE

Respondent #1

- E 2a. Probably will trip booby traps and mines because of haste
- E 2b. Probably will expose themselves to fire from adjacent building
- E 2c. Probably will be surprised from fire through walls, floors, and ceilings
- E 2d. Probably will suffer casualties from their own grenades/rounds
- E 2e. Probably will not cover access/egress routes to adjacent buildings

Respondent #2

- E 2a. Since no ropes or ladder, they will probably fail to secure bottom floor first before moving up to second floor
- E 2b. (Will not have) coordinated effort as assault elements clear building
- E 2c. Fail to use smoke grenades/CS
- C 2d. (Fail to) expand the foothold after the entire building is secured

Respondent #3

- E 2a. Lack of proper clearing techniques (i.e., booby traps)
- E 2b. Lack of protection against adjacent buildings
- E 2c. Lack of proper cover by remainder of squad while clearing rooms

Respondent #4

- E 2a. Failure to check for booby traps in rooms
- E 2b. Failure to "cover" each other during search/clearing
- NA 2c. Failure to begin clearing from the top down (may be difficult without grappling hooks/ropes)

Respondent #5

- E 2a. Confusion and congestion while moving from room to room
- \* 2b. Failure to appreciate the protective qualities of the walls

---

Code Definition

- E Error that was observed during exercise.
- C Cannot evaluate: exercise stopped too soon to evaluate.
- NA Not applicable. Scenario description stated squad did not have proper equipment.
- \* Just the opposite occurred; they thought they had protection but did not.

Table 5

## ERRORS ACTUALLY MADE BY SQUAD WHEN CLEARING BUILDING

Errors Observed by Military Expert	Respondents' Comments that Agreed with Expert's Observations				
	1	2	3	4	5
a. For initial entry, there was too much time delay between the grenade and the first soldier.					0
b. No consideration was given to open windows - 20 meters from enemy held buildings.	2b*		2b		2
c. No consideration was given to suppressing nearby buildings.					0
d. Some rooms were by-passed during clearing.		2a			1
e. The "hose-down" of the room was ineffective and indicated a lack of understanding of the purpose for this maneuver.					0
f. No consideration was given to bullet penetration of walls. In fact, grenades would have penetrated these walls.	2c				1
g. No clear communications procedure was established within elements. There was no communication between downstairs and upstairs elements.		2b			1
h. Clearing procedures were done in haste, with no consideration for booby traps, effect of smoke/debris upon observation and movement, etc.	2a		2a	2a	4
i. Did not maintain constant security.	2e		2c	2b	3
Other errors that occurred but were not explicitly commented on by the military expert.	2d	2c			2

\*See Table 4 for item identification

Table 6

ERRORS PREDICTED TO BE MADE BY THE SQUAD PROVIDING SUPPORTIVE FIRE

- | CODE  | <u>Respondent #1</u>  |
|-------|---|
| E 3a. | Will not have necessary coordination with assaulting squad, therefore,<br>(1) Will engage random suspected targets<br>(2) Will have difficulty engaging enemy fires that are causing the assault squad a problem<br>(3) Will either lift or shift fires too soon, leaving the assault squad in jeopardy, or too late, causing friendly casualties |
| C 3b. | Will not maintain a steady base of fire   |
| E 3c. | Will not consider re-positioning when lifting or shifting fires   |

Respondent #2

- |        |  |
|--------|--|
| E 3a.  | Failure to shift or lift supporting fires as the squads near the objective. Will probably shoot friendly troops by not responding quick enough to a ceasefire                |
| E 3b.  | Positioning of supporting fires to cover building to be assaulted along its long axis. Also, failure to plan fires on remaining buildings (especially building to the south) |
| E 3c.  | Failure to isolate assaulted building by fires   |
| C* 3d. | Machine guns not employed where flanking enfilade fire is possible   |

Respondent #3

- |        |  |
|--------|--|
| E 3a.  | General lack of coordination with assaulting squad               |
| E 3b.  | Not set up properly to support by fire the entire area necessary |
| NA 3c. | Bad fields of fire   |
| NE 3d. | Weapons jamming because of lack of cleanliness                   |

Respondent #4

- |       |   |
|-------|---|
| E 3a. | Failure to lift/shift fires to avoid hitting friendly troops                          |
| E 3b. | Failure to provide suppressive fires on targets around/adjacent to objective building |
| E 3c. | Failure to call for/plan indirect fires along likely avenues of withdrawal/escape     |

Respondent #5

- |        |  |
|--------|--|
| E 3a.  | Failure to shift fires to other likely enemy locations once the assault squad is in the building |
| C**3b. | Failure to hit fleeting targets in target building   |

---

Code Definition

- |     |   |
|-----|---|
| E   | Error that was observed during exercise.  |
| C   | Cannot evaluate. Supporting squad had limited blank ammunition for entire exercise. They concentrated their efforts on the assault phase. |
| C*  | Cannot evaluate, due to absence of an opposing force and lack of information regarding the enemy situation.                               |
| C** | Cannot evaluate. No way of assessing such casualties or even estimating such effects.   |
| NA  | "Fields of fire" was not the consideration in this situation. Instead, proper set-up for supporting fire was the important element.       |
| NE  | This error was not made.  |



Table 7

## ERRORS ACTUALLY MADE BY SQUAD PROVIDING SUPPORTIVE FIRE

Errors Observed by Military Expert	Respondents' Comments that Agreed with Expert's Observations				
	1	2	3	4	5
a. No attention was given to nearby buildings		3b*		3b	
b. The element was too close together - could have provided better support (and better security) for themselves if they had spread out			3b		
c. Lack of coordination between assault element and support element. Support element not lift fires soon enough.	3a	3a	3a	3a	3a
Other errors that occurred but were not explicitly commented on by the military expert.	3c	3c		3c	

Note: Observer stated that the support role was difficult to evaluate without an enemy force to orient on.

\*See Table 6 for item identification.

## DISCUSSION

Although the investigation was restricted to a single training situation, was based on only one Infantry platoon, and had a limited number of experienced Infantrymen making predictions, the results indicate that the approach has promise for future research efforts in the team training area. Obviously, the study itself should be replicated, and more training situations need to be examined to determine the generalizability of the findings. Two findings are especially important in that they point to research design changes that should be made in future research dealing with such complex team operations as the Infantry squad MOUT mission. First, more than one individual should make predictions since there was little overlap among the sets of error predictions (e.g., only one error was predicted by everyone). Second, more than one expert is probably needed for observation as the expert in the present study did not formally record all of the errors he actually observed. Other methodological changes that might increase the agreement between the predicted and actual errors would be to use individuals to make predictions who know the members of the units being trained and/or to reduce the free-response nature of the questions.

Before such diagnostic information can be used in the development of instructor guidebooks and training exercises, many additional questions need to be addressed. Such questions include can experienced training personnel at the squad, platoon or company level predict the errors that will be the most difficult to correct, the errors that vary with the skill level or experience of the individual and/or the squad, the training methods that are most effective in reducing such errors, and the best procedures for informing inexperienced leaders of such training problems.

## REFERENCES

- Caviness, J. C., & Titus, T. L. KC-135 aircrew management. Maxwell Air Force Base, Ala.: Air University, May 1977. (DTIC No. AD B020 444L)
- The company commander's training management planning book. ST 21-6-188-2. No publisher, No date.
- Department of the Army. Army training and evaluation program for Infantry battalions (Infantry, Airborne, Air Assault, and Ranger). ARTEP 7-15. Washington, D.C.: Headquarters, Department of the Army, June 1979.
- Department of the Army. How to prepare and conduct military training. FM 21-6. Washington, D.C.: Headquarters, Department of the Army, November 1975.
- Department of the Army. Individual and collective training plan for developing systems policy and procedures. TRADOC Circular 351-8. Ft. Monroe, Va.: U.S. Army Training and Doctrine Command, May 1980.
- Department of the Army. Military operations on urbanized terrain (MOUT). FM 90-10. Washington, D.C.: Headquarters, Department of the Army, August 1979.
- Department of the Army. Training management in battalions. TC 21-5-7. Washington, D.C.: Headquarters, Department of the Army, December 1977.
- Dyer, J. L., Tremble, T. R., & Finley, D. L. The structural, training, and operational characteristics of Army teams (ARI Technical Report 507). Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, 1980.
- Funk, S. L., Johnson, C. A., Batzer, E., Gambell, T., Vandecaveye, G., & Hiller, J. Combat training detractors in a sample of FORSCOM divisions: Reported impact and recommended approaches for mitigating their efforts (ARI Technical Report). Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, May 1980.
- Mirabella, A. Criterion-referenced system approach to evaluation of combat units (ARI Research Memorandum 78-21). Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, September 1978.